REMARKS — General

By the above amendment, Applicants have amended the claims to define the invention more particularly and distinctly so as to overcome the technical rejections and define the invention patentably over the prior art.

The Rejection Of The Claims Under § 112

The last O.A. rejected claims 4-6, 8-9, 14-16, 27-29, 31-32 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Particularly, the last O.A. noted that the phrase "such as" and "whereby examples" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention.

Applicants canceled the claims 4-6, 8-9, 14-16, 27-29, and 31-32, and wrote new claims 34, 36, 38-39, 42, 44, 52, and 54-55. The limitations in the claims 4-6, 8-9, 14-16, 27-29, and 31-32 are incorporated into the newly written claims 34, 36, 38-39, 42, 44, 52, and 54-55 to more particularly define the invention in a patentable manner, according to the O.A. Applicants canceled the usage of the phrase "such as" and "whereby examples" in the newly written claims 34, 36, 38-39, 42, 44, 52, and 54-55.

Accordingly, applicants request reconsideration of this rejection.

The Rejection Of The Claims Under § 103

The O.A. rejected claims 1-33 under 35 U.S.C. 103(a) as being unpatentable over Lu et al. (US 5,331,544, hereinafter Lu) in view of Meyerhofer et al. (US 2004/0095604 hereinafter Meyerhofer).

Applicants amended the claims as follows:

The Rejection Of Claim 1 on Lu and Meyerhofer Overcome

Applicants request reconsideration of the rejection, as now applicable to claim 34, for the following reasons:

(1) Novel and unobvious approaches in applicants' system are clearly foreign to Lu and Meyerhofer. The differences in the fundamental approaches are discussed later. The significant differences in the approaches between applicants' system and Lu and Meyerhofer or any combination thereof should not be underestimated or misunderstood. The non-trivial differences clearly show the novelty and unobviousness of the present invention over the prior arts.

(2) There is no justification in Lu and Meyerhofer, or in any other prior art separate from applicants' disclosure, which suggests that these references be combined, much less be combined in the manner proposed.

(3) Since the fundamental approaches in applicants' system are clearly foreign to Lu and Meyerhofer, even if Lu and Meyerhofer were to be combined in the manner proposed in the last O.A., the proposed combination would not show all the novel features of claim 34.

The Novel Features Of Claim 34 Produce New And Unexpected Results And Hence Are Unobvious And Patentable Over Lu And Meyerhofer Under § 103

Lu disclosed an automated system for collecting market research data. In Lu, the collected market research data includes monitored retail sales transactions and captured video images of retail customers. The video images of customers are analyzed using a facial recognition system to verify whether the matches to a known gallery of frequent customers are established. Lu also disclosed, "an automatic face recognition system and method to identify a retail customer," which can measure the shopping frequency at a given store.

Meyerhofer disclosed a method of printing a promotional coupon in a gaming environment by transmitting coupon data, variable data, and trigger data. Meyerhofer's coupon data included a coupon template.

Overall, Lu and Meyerhofer do not show the novel and unobvious features in applicants' present invention. The differences can comprise the following:

(1) Lu and Meyerhofer did not explicitly disclose a superimposition of the facial images on coupons or any promotional printed material.

(2) Demographic classification and the process of matching the content of coupons or the promotional printed material according to the demographic information are entirely foreign to Lu and Meyerhofer.

(3) Novel usage of uncontrolled background for the face detection is foreign to Lu and Meyerhofer.

Superimposition Of The Facial Images Is Novel Over Lu And Meyerhofer

Lu and Meyerhofer did not explain how to apply the facial image superimposition technology for the promotional printed material.

Meyerhofer explicitly disclosed their coupon could comprise four types of data fields: text fields, barcode fields, graphic fields, and line/box draw fields. [Meyerhofer, page 3, paragraph [0037]] Meyerhofer did not explicitly mention that their graphic fields could comprise the result of face images of automatic face detection.

Furthermore, Meyerhofer explicitly disclosed that the graphic fields is a static data in an explanation about "the actual value or data for each of the fields described in a coupon template" [Meyerhofer, page 3, paragraph [0038]], in a statement, "In this way, a coupon may have fields that include static data, such as graphic 312 in a graphic field, or dynamic data, such as the name of a particular patron 314 in a text field." [Meyerhofer, page 3, paragraph [0038]].

This clearly shows an important difference between Meyerhofer and the present invention by the applicants.

In applicants' system, the superimposed face image is a dynamic data. In applicants' system, face detection can be performed in an uncontrolled background, and the detected face images are superimposed onto graphical objects on the coupons, "the detection of the face can be done in an uncontrolled background in the UCOUPON system. The UCOUPON system superimposes 272 the customer's face (head) image onto graphical objects and prints them on coupons 801" [Applicants, page 25, lines 3-5]. Therefore, the superimposed face images can dynamically change according to the times when they are captured, and the appearance of the coupons and

their graphical objects can vary every time they are generated. Lu is entirely foreign to the superimposition of facial images onto coupons and any promotional printed material.

Demographic Classification And Matching The Content Of Coupons Or The Promotional Printed Material According To The Demographic Information Are Novel Over Lu And Meyerhofer

The fundamental approach of the computer vision algorithm in Lu for face recognition is different from the demographic classification in the present invention of applicants.

In the practiced art, face detection, facial feature detection, face identification, and demographic classification, can be regarded as separate sub-areas of the computer vision study, which deals with the human face image as the target object for the image processing. Other sub-areas in the computer vision study can also include hand and body parts detection and tracking, gesture recognition, gaze detection, and gait recognition. The approaches and application of the algorithms in these sub-areas are fundamentally different, although they may look similar to each other and use same or similar numerical formulas or algorithms.

In general, face detection is related to the processes of localizing human face images against other non-face objects on the background in captured input images within the field of view of a camera. Facial feature detection is related to the processes of localizing sub-features, such as eyes, nose, and mouth, on the face images. Face identification is related to the processes of identifying a face image of a particular person against other face images in the face image database, and verifying who the person is. Demographic classification specifically deals with the

processes of obtaining demographic information of the target person, such as gender, age, and ethnicity, from the localized face images.

Lu did not explicitly disclose how to process demographic classification and demographic data collection of the people. Lu disclosed an automatic face recognition system, which is to identify a retail customer. [Lu, column 3, lines 15-57]. Lu's face recognition is clearly different from the demographic classification in applicants' present invention.

Lu is further foreign to the idea of matching the content of coupons or the promotional printed material according to the demographic information from the demographic classification. Meyerhofer is entirely foreign to this.

Novel Usage Of Uncontrolled Background For The Face Detection

Lu explicitly disclosed, "A relatively featureless sheet 24 is used to provide a uniform background against which the image of the shopper's face can be more easily framed and identified." [Lu, column 4, lines 59-62]. This clearly shows that Lu is limited by the usage of a "featureless sheet 24" in order to control the background to have a uniform background to identify the face image more easily. Lu is clearly foreign to the novel usage of "uncontrolled background" for the face detection in applicants' present invention, as noted "As in the exemplary embodiment shown in FIG. 1, the UCOUPON can detect the face (head) of the customer and superimpose the image on to the coupons in an uncontrolled background." [Applicants, page 24, lines 9-11]. Lu's background updating and elimination in [Lu, column 7, lines 4-35, especially lines 13-30] based on the motion detection and the frame differencing is clearly and significantly different from the applicants' face detection and superimposition of the

face image in an uncontrolled background, as it is well known in the practiced art of face detection.

Furthermore, Lu is clearly foreign to the "contact-free interface" in an "uncontrolled background" in applicants' present invention, as noted "The UCOUPON can also allow the customer 408 in an uncontrolled background interact with the digital contents, using the contact-free interface, as described in the exemplary embodiment shown in FIG. 2." [Applicants, page 31, lines 15-17].

Lu And Meyerhofer Do Not Contain Any Justification To Support The Combination, Much Less In The Manner Proposed

Due to the differences mentioned above in the fundamental approaches for applying computer vision algorithms, there is a significant lack of proof that supports the proposed combination in the last O.A. Since Lu and Meyerhofer do not show the novel and unobvious features in applicants' present invention, there is clearly no logical connection that suggests the proposed combination. Furthermore, the prior arts themselves do not contain any suggestion that they be combined in the manner proposed.

In addition, Lu disclosed a method for measuring the degree of attentiveness, "The unit 22 will acquire images of all shoppers who are deemed to pay at least a minimum amount of attention to the display, for example, all those who approach within a predetermined distance and look at the display for at least a predetermined time," [Lu, column 9, lines 46-59]. In Lu, the attentiveness measurement was based on the assumption that the shoppers in the acquired images are

considered to pay attention to the display, regardless of whether the shoppers actually looked at the display or not. However, this assumption cannot be used as a basis to provide accurate measurement for the attentiveness. Not all the shoppers within a predetermined distance of the display actually look at the display. They could be just passers-by or they could just look at other objects in the vicinity of the display. Therefore, it is not appropriate to conclude that the shoppers looked at the display based solely on the fact that they are within the predetermined distance from the display in the acquired images, unless there is an actual measurement that their head orientation is directed exactly toward the display.

However, more importantly, this feature, the attentiveness measurement, in Lu clearly shows that the direction of the application field in Lu is clearly different from that of applicants' present invention, in which the novel approach for the superimposition of the facial images onto coupons or any promotional printed material and the novel approach for matching the content of coupons or the promotional printed material according to the demographic information are disclosed.

As Lu explicitly noted in [Lu, column 9, lines 46-51], "the greatest value" of Lu "will arise from the ability to associate a frequent shopper's purchases with his or her identity in an unobtrusive manner", not from the superimposed and customized coupon printing.

Even If Lu And Meyerhofer Were To Be Combined In The Manner Proposed, The Proposed Combination Would Not Show All The Novel Features Of Claim 34

However even if the combination of Lu and Meyerhofer were legally justified, claim 34 would still have novel and unobvious features over the proposed combination, since the fundamental approaches in applicants' present invention are clearly foreign to Lu and Meyerhofer.

Specifically, clauses (a), (d), and (e) clearly distinguish applicants' present invention from Lu and Meyerhofer, or any possible combination thereof.

Neither Lu nor Meyerhofer show the features in clauses (a), (d), and (e).

The Dependent Claims Are a Fortiori Patentable Over Lu And Meyerhofer

New dependent claims 35 to 41 incorporate all the subject matter of claim 34 and add additional subject matter, which makes them a fortiori and independently patentable over the reference.

Claim 35 further adds a step of processing a store traffic control. In applicants' present invention, "The customer can immediately redeem the coupon 862 in the UCOUPON system. In this case, the coupon can be used as a means to encourage people to visit specific sites as a way of promoting goods or services sold at the visited site, which is managed by the store traffic control 842 scheme. As one of the schemes, the UCOUPON system can ask the customers to redeem the coupon within a fixed duration of time after the coupon is issued. The idea behind this scheme is to advertise other related products on the way in the store, while the customer walks to the designated place to redeem the coupon." [Applicants, page 28, lines 3-10]. The "store traffic control" [also in Applicants, item 842, FIGs 4-6, and 8] by the present invention between the pick up of the coupon and the instant coupon redemption or between the remote coupon printing and the remote coupon pickup is foreign to Lu and Meyerhofer.

Meyerhofer's description for coupon redemption in [Meyerhofer, paragraph [0027]] or "The contents of the promotional database" in [Meyerhofer, paragraph [0034]] does not explicitly teach the "store traffic control" as in the present invention by the applicants.

Claim 36 further adds a step of processing customer interaction by providing one or a plurality of interfaces. Especially, the interfaces in the present invention can comprise a keyboard, mouse, touch-screen, and contact-free interface.

In Lu, there is no explicit description that teaches the novel usage of the interfaces for printing facial images of a person or a plurality of persons, from a sequence of images automatically captured by one or a plurality of means for capturing images, onto one or a plurality of coupons or any promotional printed material. Lu teaches "Other inputs, such as a keyboard (not shown) and outputs, such as a display (not shown) may also be used with the local computer module 26" [Lu, column 5, lines 64-67] for "during installation or maintenance of the system as is known in the art" [Lu, column 5, lines 67-68].

Furthermore, Lu and Meyerhofer are foreign to the usage of a contact-free interface in the application, whereas applicants' present invention explicitly teaches, "For the stand-alone UCOUPON, as in the exemplary embodiment shown in FIG. 2, the UCOUPON can also allow the customer 408 in an uncontrolled background interact with the digital contents, using the contact-free interface. The contact-free interface can be implemented using any of the reliable real-time gesture recognition technology in the computer vision." [Applicants, page 24, lines 16-20], in addition to the usage of the conventional interaction means as in, "For the stand-alone UCOUPON, as in the exemplary embodiment shown in FIG. 2, the UCOUPON can also allow the customer 408 in an uncontrolled background interact with the digital content displayed through the means for displaying digital contents 111, using conventional interaction means,

such as keyboard, mouse, or touch-screen, which can be found in conventional Kiosk." [Applicants, page 24, lines 12-16]

Claim 37 further adds a step of utilizing the data gathering services for demographics based on the computer vision technologies to provide visibility to customer traffic, composition, and behavior. Lu disclosed, "The frequent shopper database 80 is also preferentially updated by an adaptive learning process, shown at block 90 in FIG. 5, at each recognition." [Lu, column 8, lines 42-44], and Lu also disclosed, "In this process, the results of the current recognition are combined with information in the database 80 to define a new standard feature set corresponding to the shopper who has just been identified." [Lu, column 8, lines 44-48]. In Lu, the adaptive learning process accommodates the system to small changes in the physical "appearance of the shopper", as Lu's example explicitly mentions a change of hair style, but not the demographic information of the shopper. However, applicants' example of the utilization of the data gathering services for demographics based on the computer vision technologies explicitly mentions the usage of demographic information of the shopper, as in "For example, if the customer is a female adult, the coupon can be more oriented to the favorites, such as clothing or cosmetics specials of the day, of the corresponding demographic group." [Applicants, page 27, lines 4-6]. Furthermore, Lu explicitly explained the details of the "adaptive learning process" and the "new feature set", in [Lu, column 9, lines 17-45], and mentioned the new image feature set from the customer's face can be used in the adaptive learning process to improve the Frequent Shopper database with the new feature set with regard to the customer's identification. However, Lu did not explicitly teach how to utilize the data gathering services for demographics based on the

computer vision technologies to provide visibility to customer traffic, composition, and behavior at all. Meyerhofer is completely foreign to this.

Claim 38 further adds a step of executing the demographic classification at various stages of coupon creation and redemption. In the present invention, the various stages can comprise a stage at the time of said person detection, a stage at the time of said coupon creation, and a stage at the time of said coupon redemption.

In [Lu, column 7, lines 5-16], Lu is related to facial image detection, whereas applicant's computer vision algorithm in the new claim 38 is related to demographic classification. Although, Lu briefly disclosed, "a shopper's attentiveness to a display or advertisement may be correlated with purchases of products and with other demographic purchase-related variables," [Lu, column 3, lines 41-44], Lu did not explicitly disclose how to obtain the demographic classification for face image superimposed coupon creation and redemption. In addition, Lu's explicit description, "at the beginning of a checkout or retail sales transaction", shows the facial image detection only at one stage.

Not only is Lu foreign to the idea of executing the demographic classification for coupon printing, but also Lu is clearly foreign to the idea of executing the demographic classification at various stages of coupon creation and redemption. Meyerhofer is completely foreign to this. For example, they are completely foreign to the "first demographic data collection" [Applicants, page 25, lines 25-27] and the "second stage of demographics data collection" in the present invention [Applicants, page 34, lines 20-21, and page 37, line 9 - page 38, line 2].

Claim 39 further adds a step of gathering the information about the customers from the plurality of demographic classification by analyzing and comparing the demographic information results from the various stages. As discussed in regards to Claim 38, Lu and Meyerhofer are completely foreign to the demographic information results from the various stages. Lu and Meyerhofer are further foreign to the idea of gathering the information about the customers from the plurality of demographic classification by analyzing and comparing the demographic information. Furthermore, Lu and Meyerhofer are entirely foreign to the idea of gathering the information not only for returning customers, but also for those who do not redeem the coupons, based on the analysis and comparison of the automatic demographic classification results at the various stages.

Accordingly applicants submit that the dependent claims are a fortiori patentable and should also be allowed.

In addition, applicants request consideration of new dependent claims 40 and 41, which incorporate all the subject matter of claim 34 and add additional subject matter, which makes them a fortiori and independently patentable over the reference.

Claim 40 further adds a step of generating face-based identifications of said person or said plurality of persons at the time of coupon pickup to see whether the person who picks up the coupon is the right person for the coupon or not. In applicants' present invention, "The face image of the customer can be used for the face-based ID generation 848 at the time of coupon pickup, to see whether the person who picks up the coupon is the right person for the coupon or

not. Thus, the customer does not have to carry anything while walking toward the remote coupon pickup place, but just go and show her/his face to claim the coupon." [Applicants, page 34, lines 3-7]. Lu and Meyerhofer are foreign to the idea of generating "face-based identifications" for the coupons or the promotional printed material that are superimposed by the facial images of the people who pick up the coupons or the promotional printed material.

Claim 41 further adds a step of verifying the legitimacy of the coupon redemption. In applicants' present invention, "the customer and coupon-matching module 845 can verify the legitimacy of the coupon redemption, thus preventing some of the problems in the paper-based conventional coupon redemption systems, such as coupon fraud, duplicate redemption of the same coupon to the same customer, or inefficiency of issuing coupons to the second time customer (not new customer)." This is foreign to Lu and Meyerhofer.

The Rejection Of Claims 11-20 on Lu and Meyerhofer Overcome

The last O.A. noted that claims 11-20 differ from claims 1-10 only in that claims 1-10 are method claims whereas, claims 11-20 are apparatus claims.

Applicants canceled claims 11-20 and wrote new apparatus claims 42-49, which recite limitations that are similar and in the same scope of invention as to those in claims 34-41 above. Therefore, applicants request consideration of the newly written claims 42-49 for the same reasons as stated above in regards to claims 34-41, respectively.

The Rejection Of Claims 21-33 on Lu and Meyerhofer Overcome

Applicants canceled claims 21-33 and wrote new claims 50-57, which recite limitations that are similar and in the same scope of invention as to those in claims 34-41 above.

Applicants request consideration of the newly written claims 50-57 for the same reasons as stated above in regards to claims 34-41, respectively.

References Cited As Being Considered Pertinent to Applicants' Disclosure

The last O.A. noted that Katz (US 2002/0107729), Scroggie, et al. (US 6,885,994 hereinafter Scroggie), Slater, et al. (US 6,483,570 hereinafter Slater), and Eldering (US 7,062,510) as being considered pertinent to applicants' disclosure. However, claim 34 has novel and unobvious features over the references. Specifically, clauses (a), (d), and (e) clearly distinguish applicants' present invention from the references, or any possible combination thereof. None of the references shows the features in clauses (a), (d), and (e). The references are further foreign to the dependent claims.

Katz disclosed a method of determining a time at which a promotion is to be provided based on the parameters related to the promotions, using the identification information of a consumer. Katz is entirely foreign to the idea of printing facial images of people onto coupons or any promotional printed material, with the superimposition of the facial images, in an uncontrolled background. Katz did not explicitly disclose the idea of processing demographic classification for the people, using a computer vision based demographic classification technology. Katz disclosed, "age, profession, gender, race, education level, marital status, number of children, pet

ownership, and/or other demographic factors." as examples of the data that the "consumer demographic table 616" can contain, regarding the demographics of the individual consumer [Katz, paragraph [0041] and paragraph [0055]]. Profession, education level, marital status, number of children, and pet ownership cannot be automatically measured by the computer vision based demographic classification technology. This clearly shows that Katz is foreign to the idea of utilizing the automatic demographic classification technology in the practiced area of the computer vision, and Katz teaches away from the novel features of applicants' present invention.

Scroggie disclosed, "each coupon image is generated dynamically to include this consumer-supplied information, which is required principally for security reasons" [Scroggie, column 10, lines 21-24]. This and the list of "input information that has to be incorporated into each coupon" [Scroggie, column 10, lines 32-49] clearly show that Scroggie is entirely foreign to the superimposition of the facial images onto coupons or any promotional material, based on automatic face detection technology, which does not require any "consumer-supplied information", in an uncontrolled background, using a means for capturing images. Scroggie is also entirely foreign to the automatic demographic classification based on the facial images of the people, although Scroggie mentioned a method of gathering the demographic information through the "Household Registration" as "a secondary purpose" in [Scroggie, column 9, lines 26-39].

Slater disclosed, a method of generating a customer certificate based on a match between an image content identification and a different image content identification stored in a memory with

respective predetermined customer certificate data. Slater is entirely foreign to the idea of printing facial images of people onto coupons or any promotional printed material, with the automatic superimposition of the facial images. Slater is further foreign to the idea of automatic demographic classification for the people in input images, and matching the content of coupons or the promotional printed material according to the demographic information. While applicants' present invention teaches the matching of the content of coupons or the promotional printed material according to the demographic information of people based on the automatic demographic classification, Slater teaches the generation of a customer certificate based on a match between two image content identifications based on "the assistance of an operator" manually [Slater, column 3, lines 6-15]. Furthermore, Slater explicitly disclosed the details of the "content identification" in [Slater, column 5, line 51 – column 6, line 49], which clearly show that Slater's "content identification" teaches totally different ideas in a different field from the field of automatic demographic classification in applicants' present invention. For example, "content identifications based on an action, configuration or interaction of one or more identified scene objects include "sleeping", "driving", "boating", "wedding", "funeral", "graduation", "cruise", "beach party", and the like" in [Slater, column 6, lines 1-5] clearly teach different ideas from the field of applicants' present invention.

Eldering disclosed a method for profiling a consumer based on consumer purchases. Eldering disclosed, "a new demographic characterization vector is calculated based on the purchase, the existing demographic characterization vector, and the heuristic rules" [Eldering, column 4, lines 57-59]. Eldering's household demographics included "household size and income" that were

accomplished by applying heuristic rules [Eldering, column 9, lines 52-65]. However, household size and income cannot be automatically measured by the computer vision based demographic classification technology. Regardless of the "probabilistic demographic characterization vectors" or the "deterministic demographic characterization vector" [Eldering, column 10, lines 47-67], Eldering is foreign to the method of automatic demographic classification based on the automatically detected facial images of people using a means for capturing images, without requesting any input from the people. Eldering is entirely foreign to the idea of printing facial images of people onto coupons or any promotional printed material, with the superimposition of the facial images, in an uncontrolled background.

CONCLUSION

For all the above reasons, applicants submit that the specification and claims are now in proper form, and that the claims all define patentably over the prior art. Therefore they submit that this application is in condition for allowance now, which action they respectfully solicit.

Conditional Request for Constructive Assistance

Applicants have amended the specification and claims of this application so that they are proper, definite, and define novel structure, which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicants **very respectfully request** the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. § 2173.02 and § 707.07(j) in order that the undersigned can place this application in allowable condition.

Very respectfully,

Rajeev Sharma Namsoon Jung

----------Applicants Pro Se----------

403 South Allen Street, Suite 101

State College, PA 16801

Tel. (814) 867-8977; Fax (814) 867-8957

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Date: 6/29/2007 Inventor's Signature: Rsharma